SECTION 5
FACILITY REQUIREMENTS

The process of determining facility requirements involves the application of airport planning standards to the projected airport activity to identify the facilities needed to handle the expected traffic. By comparing the future facility needs with existing facility sizes and capacities, facility deficiencies (and needed improvements) are determined.

AIRPORT CLASSIFICATION AND FAA PLANNING STANDARDS

The FAA in its current Advisory Circular AC 150/5300-13, Airport Design, has developed an Airport Reference Code (ARC) system that relates airport design criteria and planning standards to two components: (1) the operational characteristics and (2) the physical characteristics of aircraft operating at or expected to operate at the airport.

The first element of the code, the aircraft approach speed category, relates to operational characteristics. The aircraft approach category is a grouping of aircraft that is based on 1.3 times the stalling speed (Table 5-1).

Table 5-1
AIRCRAFT APPROACH CATEGORIES

Category	Approach Speed
A	Speed less than 91 knots
B	Speed 91 knots or more but less than 121 knots
C	Speed 121 knots or more but less than 141 knots
D	Speed 141 knots or more but less than 166 knots
E	Speed 166 knots or more

Source: FAA, Airport Design, AC 150/5300-13.

The second component of the ARC is the airplane design group and relates to the wingspan of aircraft and therefore is a physical characteristic (Table 5-2). Airplane Design Group I has a further subdivision for those airports serving small airplanes (12,500 pounds or less maximum takeoff weight) exclusively.

Table 5-2
AIRPLANE DESIGN GROUPS

Airplane Design Group	Wingspan
I	Up to but not including 49 feet
II	49 feet up to but not including 79 feet
III	79 feet up to but not including 118 feet
IV	118 feet up to but not including 171 feet
V	171 feet up to but not including 214 feet
VI	214 feet up to but not including 262 feet

Source: FAA, Airport Design, AC 150/5300-13.

The aircraft approach speed element of the ARC generally deals with runways and runway related facilities whereas the wingspan (and relevant airplane design group) relates to separations required between airfield elements, such as runway-taxiway separations and taxilane-apron clearances.

The airport is currently designed to meet the ARC B-I standards, for small airplanes only. This category includes aircraft as large as the Beech Baron, Beech King Air B100, Cessna 404, and Piper Cheyenne. All aircraft operated in the College's Aviation program are within the B-I small airplane category (see Appendix B). Furthermore, the aircraft envisioned to be used by the College in the future will conform to ARC B-I category, for small airplanes. Therefore, the ARC B-I standards, for small airplanes, are the applicable standards for master planning and design of Cochise College Airport. Although there may be occasional transient aircraft at the airport exceeding this classification, the numbers of operations by those aircraft have been and will continue to be insignificant.

Table 5-3 compares existing airfield dimensions with the airport planning standards, taken from FAA Advisory Circular AC 150/5300-13, Airport Design, for an Airport Reference Code of B-I, for small airplanes.[1] Presently, the airport meets all of the FAA and State of Arizona standards for the aircraft regularly using the airport (i.e., ADG B-I for small airplanes). The standards in Table 5-3 allow for an instrument approach at one end of the runway with visibility minimums not lower than one mile to protect for a future instrument approach at the airport.

[1] Throughout the remainder of this report, ARC B-I will refer to the ARC B-I standards for small airplanes, unless noted otherwise.

Because the College has considered operating a small turboprop aircraft, such as the Beech 1900, in its training program, the B-I standards were compared with standards for smaller turboprop aircraft in the event that a turboprop aircraft might be operated at the Cochise College Airport instead of another airport, such as Tucson International. For these aircraft, the ARC B-II standards would apply (Table 5-3). Application of planning and design standards for this aircraft group would ensure that the airport would continue to accommodate the single and multi-engine piston aircraft currently used in the College's aviation program, as well as smaller turboprops. ARC B-II standards are shown in Table 5-3 for the general category of B-II aircraft as well as the airplane-specific standards for the Beech 1900C. Many key dimensions at the airport, such as runway width, taxiway width and runway-to-taxiway separation, do not meet these standards.

Table 5-3
AIRPORT PLANNING STANDARDS
FOR AIRPORT REFERENCE CODES B-I AND B-II

Item	Existing Dimension (Feet)	ARC B-I Requirement for Small Airplanes (Feet)	ARC B-II Requirement (Feet)	ARC B-II Requirement for Beechcraft 1900C (Feet)
AIRPORT CATEGORY AND AIRPORT DATA				
Aircraft Approach Category		B	B	B
Airplane Design Group		I [e]	II	II
Airplane wingspan		48.99	78.99	54.5
Airplane undercarriage width (1.15 x main gear track)		17	25.6	19.8
Airport elevation (MSL)	4,124			
SEPARATION STANDARDS				
Runway centerline to parallel runway centerline	NA	700	700	700
Runway centerline to parallel taxiway/taxilane centerline	200	150	240	227.3
Runway centerline to edge of aircraft parking	305 [c]	125	250	250
Taxiway centerline to parallel taxiway/taxilane centerline	[a]	69	105	75.4
Taxiway centerline to fixed or movable object	100 [c]	44.5	65.5	48.2
Taxilane centerline to parallel taxilane centerline	NA	64	97	70
Taxilane centerline to fixed or movable object	[a]	39.5	57.5	42.8
RUNWAY PROTECTION ZONES [b]				
Runway protection zone at instrument approach end:				
Length	NA	1,000	1,000	1,000
Width 200 feet from runway end	NA	250	500	500
Width 1,200 feet from runway end	NA	450	700	700
Runway protection zone at visual approach end:				
Length	1,000	1,000	1,000	1,000
Width 200 feet from runway end	250	250	500	500
Width 1,200 feet from runway end	450	450	700	700
FAR PART 77 SURFACES [b] [f]				
Primary Surface width	250	250	500	500
Radius of Horizontal Surface	5,000	5,000	10,000	10,000
Approach Surface at instrument approach end:				
Approach Surface length	NA	5,000	10,000	10,000
Approach Surface width at end	NA	1,250	3,500	3,500
Approach Surface slope	NA	20:1	34:1	34:1
Approach Surface at visual approach end:				
Approach Surface length	5,000	5,000	5,000	5,000
Approach Surface width at end	1,250	1,250	1,500	1,500
Approach Surface slope	20:1	20:1	20:1	20:1

Table 5-3
AIRPORT PLANNING STANDARDS
FOR AIRPORT REFERENCE CODES B-I AND B-II
(Continued)

Item	Existing Dimension (Feet)	ARC B-I Requirement for Small Airplanes (Feet)	ARC B-II Requirement (Feet)	ARC B-II Requirement for Beechcraft 1900C (Feet)
OBSTACLE FREE ZONES				
Runway obstacle free zone (OFZ) width	[a]	250	400	400
Runway OFZ length beyond each runway end	[a]	200	200	200
RUNWAY DESIGN STANDARDS				
Runway width	72	60	75	75
Runway shoulder width	[a]	10	10	10
Runway blast pad width	NA	80	95	95
Runway blast pad length	NA	60	150	150
Runway safety area width	[a]	120	150	150
Runway safety area length beyond each runway end or stopway end, whichever is greater	[a]	240	300	300
Runway object free area width	[a]	250	500	500
Runway object free area length beyond each runway end or Stopway end, whichever is greater	[a]	240	300	300
Clearway width	NA	500	500	500
Stopway width	NA	60	75	75
TAXIWAY DESIGN STANDARDS				
Taxiway width	20	25 [d]	35	35
Taxiway edge safety margin	[a]	5	7.5	7.5
Taxiway shoulder width	[a]	10	10	10
Taxiway safety area width	[a]	49	79	54.5
Taxiway object free area width	[a]	89	131	96.3
Taxilane object free area width	[a]	79	115	85.5
Taxiway wingtip clearance	[a]	20	26	20.9
Taxilane wingtip clearance	[a]	15	18	15.5
THRESHOLD SURFACES [b]				
Threshold surface at the instrument approach end:				
Distance out from threshold to start of surface	NA	200	200	200
Width of surface at start of trapezoidal section	NA	400	800	800
Width of surface at end of trapezoidal section	NA	3,400	3,800	3,800
Length of trapezoidal section	NA	10,000	10,000	10,000
Length of rectangular section	NA	0	0	0
Slope of surface	NA	20:1	20:1	20:1
Threshold surface at the visual approach end:				
Distance out from threshold to start of surface	[a]	0	0	0
Width of surface at start of trapezoidal section	[a]	250	400	400
Width of surface at end of trapezoidal section	[a]	700	1,000	1,000
Length of trapezoidal section	[a]	2,250	1,500	1,500
Length of rectangular section	[a]	2,750	8,500	8,500
Slope of surface	[a]	20:1	20:1	20:1

Table 5-3
AIRPORT PLANNING STANDARDS
FOR AIRPORT REFERENCE CODES B-I AND B-II
(Continued)

[a] Not shown on existing Airport Layout Plans.
[b] Requirements assume one runway end (Runway 23) will support a circling GPS instrument approach procedure (day and night) with visibility minimums not lower than 1 mile, and the other runway end (Runway 5) will have only visual approaches.
[c] Estimated.
[d] The standard is 18.1 feet for the Beech Baron, the largest aircraft regularly using the airport.
[e] Small airplanes only (up to 12,500 pounds maximum certificated takeoff weight).
[f] FAR Part 77 surfaces provide an identification of potential obstacles to air navigation.
NA = Not applicable.
Sources: FAA Advisory Circular AC 150/5300-13, Airport Design; Federal Aviation Regulations Part 77, Objects Affecting navigable Airspace.

AIRFIELD CAPACITY REQUIREMENTS

Hourly runway capacities and annual service volume (ASV) estimates are needed to compare projected operations activity with airfield capacity and identify the potential need for airfield improvements. The method for computing airport capacity is described in FAA Advisory Circular AC 150/5060-5, Airport Capacity and Delay. The ASV is a reasonable estimate of an airport's annual capacity. It accounts for differences in such factors as runway use, aircraft mix, and weather conditions that would be encountered over a year's time.

Runway Hourly Capacity

The hourly capacity estimates were derived in accordance with instructions and capacity curves set forth in FAA AC 150/5060-5. For periods when touch-and-go operations represent over 40 percent of the total, the visual flight rules (VFR) hourly capacity of the runway is 138 operations (each touch-and-go is two operations). VFR conditions occur whenever the cloud ceiling is at least 1,000 feet above ground level and visibility is at least three statute miles.

Runway capacity is based on the following parameters:

- Runway use is 60 to 70 percent on Runway 5, and 30 to 40 percent on Runway 23.
- Touch-and-go operations are approximately 90 percent of the total.
- Operations are 50 percent arrivals and 50 percent departures.
- Two exit taxiways are available, one at midfield and one at the end of the runway.

Annual Service Volume (ASV)

The ASV is calculated to be 230,000 operations a year based on FAA AC 150/5060-5 and the projected number of operations for 2020. The ASV will vary with demand because the capacity methodology considers the effects of delays on operations capacities. The ASV of an airport can also vary over time with changes in airfield or airspace geometry, ATC procedures, weather and mix of aircraft operating at the airport.

Hourly and Annual Delay

The estimated peak-hour aircraft operating delays in 1999 totaled approximately 2.5 minutes, based on a calculated delay of 0.05 minutes per aircraft operation (using the methodology of FAA AC 150/5060-5). In 2020, the total peak-hour delays are expected to reach 13.2 minutes, or about 0.2 minutes per aircraft operation.

Demand Versus Capacity

By comparing ASV and hourly capacities with the forecast annual and peak hour demand, the potential need for airfield improvements is determined. As seen in Table 5-4, the present airfield will easily accommodate demand through the planning period. Generally, capacity improvements should be initiated when demand is forecast to utilize 60 percent of capacity (FAA Order 5090.3B). This allows sufficient lead-time to develop the improvement before the airport experiences intolerable delays.

From this comparison of demand and capacity it is concluded that airfield (runway/taxiway) improvements are not needed for the purpose of increasing airfield capacity.

Table 5-4
DEMAND VERSUS CAPACITY
COCHISE COLLEGE AIRPORT

	Actual	Projected		
Item	**1999**	**2005**	**2010**	**2020**
Annual Operations				
Demand	55,180	73,330	80,630	98,830
Capacity	230,000	230,000	230,000	230,000
% Capacity Utilized	24%	32%	35%	43%
Hourly Operations				
Demand	50	58	60	66
Capacity	138	138	138	138
% Capacity Utilized	36%	42%	43%	48%

Source: Analysis by P&D Aviation.

RUNWAY REQUIREMENTS

This section identifies runway requirements needed to satisfy the forecast demand in terms of runway length, pavement strength requirement, crosswind coverage and safety areas. Planning and design standards set forth in FAA AC 150/5300-13, Airport Design, for Airport Reference Code B-I form the basis of this analysis.

Crosswind Runway

Annual wind data, in the form of a wind rose, was obtained for Bisbee-Douglas International Airport, which is the nearest source of relevant weather data for Cochise College Airport. Winds are primarily from the west-southwest and southwest.

According to FAA criteria in AC 150/5300-13, Airport Design, a runway should provide at least 95 percent crosswind coverage. This means that winds with a crosswind component exceeding the standard velocity for the airport's ARC should occur less than five percent of the time, on an annual basis. Wind coverage is based on a 10.5-knot (12 mile per hour) crosswind for ARC B-I. The existing runway provides 95.8 percent average annual coverage for a 10.5-knot crosswind. This meets FAA recommendations for wind coverage, and an additional runway for improved crosswind coverage is not needed.

Runway Length

Runway length is a critical consideration in airport planning and design. Aircraft need sufficient runway lengths to operate safely under varying conditions of airport elevation, wind, temperature and takeoff weight.

FAA Advisory Circular 150/5325-4A contains criteria used in developing runway lengths required for various general aviation utility and transport airports. The recommended runway lengths are based on performance information from manufacturer's flight manuals in accordance with provisions in Federal Aviation Regulations (FAR) Part 23, Airworthiness Standards: Normal, Utility and Acrobatic Category Airplanes, and FAR 91, General Operating and Flight Rules.

Aircraft performance and site characteristics are considered in analyzing runway length. The site characteristics include: airport elevation, temperature (mean maximum temperature of the hottest month), runway gradient and wind conditions. The FAA Airport Design (Version 4.1) software package contains a program to calculate typical runway requirements for various classes of aircraft. This model was applied, with the airport site characteristics and results shown in Table 5-5. As seen in Table 5-5, the recommended runway lengths for small airplanes (less than 12,500 pounds) with approach speeds of 50 knots or more range from 4,110 to 5,720 feet.

The present runway length of 5,303 feet satisfies the requirements for almost 95 percent of small aircraft with approach speeds of 50 knots or greater.

Because a turboprop aircraft could potentially be acquired by the College for flight training, the runway length requirement for a Beech 1900C was determined for the same conditions as shown in Table 5-5 and a takeoff weight of 13,000 pounds. A runway length of 3,400 feet is required for these conditions according to the performance charts for the Beech 1900C, supplied by the manufacturer, Raytheon Aircraft.

Therefore, an extension of the runway length is not needed to satisfy the planned or potential flight training needs of the College.

Runway Width

The runway width requirement is based upon the physical and performance characteristics of aircraft using the runway. The characteristics of importance are wingspan and approach speeds. FAA Advisory Circular AC 150/5300-13 specifies a runway width of 60 feet for ARC B-I and a width of 75 feet for ARC B-II. The present runway width of 72 feet meets the standard for current operations but would have to be widened to 75 feet to accommodate ARC B-II aircraft.

Table 5-5
FAA RECOMMENDED RUNWAY LENGTHS
FOR COCHISE COLLEGE AIRPORT

AIRPORT AND RUNWAY DATA

Airport elevation	4,124 feet
Mean daily maximum temperature of the hottest month	93.9° F
Maximum difference in runway centerline elevation	34 feet
Surface winds	calm

RUNWAY LENGTHS RECOMMENDED FOR AIRPORT DESIGN

Small airplanes with approach speeds of less than 30 knots	420 feet
Small airplanes with approach speeds of less than 50 knots	1,130 feet
Small airplanes with approach speeds of 50 knots or greater and less than 10 passenger seats	
75 percent of these small airplanes	4,110 feet
95 percent of these small airplanes	5,400 feet
100 percent of these small airplanes	5,720 feet
Small airplanes with approach speeds of 50 knots or greater and 10 or more passenger seats	5,720 feet

Sources: AC 150/5325-4A, Runway Length Requirements for Airport Design; P&D application of FAA Airport Design (Version 4.1).

Runway Grades

The FAA standard for maximum longitudinal runway grade is 2.0 percent for the critical aircraft at Cochise College Airport (Approach Category B). The runway conforms to standards as the maximum gradient is 0.73 percent, located in the west 1,200 feet of the runway. Generally the grades vary between 0.62 and 0.66 percent, averaging 0.65 percent.

A runway should have adequate transverse slopes to prevent the accumulation of water on the surface. A maximum transverse grade of 1.0 to 1.5 percent is recommended by FAA for Approach Category B. The runway meets transverse grade requirements. The runway "crown" is located along the runway centerline.

Pavement Strength

Runway 5/23 is not rated for pavement strength but has been demonstrated to handle an aircraft with a gross takeoff weight of 49,000 pounds on one occasion and aircraft with single wheel configurations up to 12,500 pounds gross weight This pavement strength is sufficient to accommodate anticipated aircraft, The need for runway strengthening is not required. Considering the extreme conditions posed by the desert climate as it relates to pavement weathering, it will be assumed that one or more pavement rehabilitation programs (crack repair and seal coat and/or overlay) will be required during the planning period. The pavement was evaluated as part of the new statewide Airport Pavement Management System program and the airport is planning to implement the program in the year 2001.

Runway Safety Area

A Runway Safety Area (RSA) is defined as a rectangular area centered about the runway that is cleared, drained and graded. This area should be capable of accommodating occasional aircraft that may veer off the runway, as well as fire fighting equipment. The ARC B-I criteria for the RSA is an area 120 feet wide centered on the runway centerline and extending 240 feet beyond each runway end. The ARC B-II criteria for the RSA is an area 150 feet wide centered on the runway centerline and extending 300 feet beyond each runway end.

The present airfield area will accommodate the ARC B-I RSA along Runway 5/23 and at the end of Runway 5. The private road to the rodeo grounds passes through a corner of the RSA for Runway 23. Options for maintaining conformity with the FAA standards for the RSA at the end of Runway 23 are discussed in the next subsection.

Runway Object Free Area

The Runway Object Free Area (ROFA) is a two-dimensional ground area surrounding the runway. Its clearing standard precludes parked aircraft and objects, except those fixed by function. The criteria replaces the former design standard of the aircraft parking limit line. The design standard for an ARC of B-I is a ROFA 250 feet wide centered on the runway centerline and extending 240 feet beyond the end of the runway. The design standard for an ARC of B-II is a ROFA 500 feet wide centered on the runway centerline and extending 300 feet beyond the end of the runway. The ROFA at the end of Runway 5 meets ARC B-I standards.

The College owned road at the end of Runway 23 on airport property is used occasionally by Cochise College to access the rodeo training grounds. This road passes through the east corner of the RSA and ROFA of Runway 23 (Figure 5-1). The RSA and ROFA beyond the end of Runway 23 do not apply to landings on Runway 23 because of the displaced threshold on Runway 23 (described in Section 3).. They also do not apply to departures on Runway 23. However, they apply to landings and departures on Runway 5. To comply with RSA and ROFA standards, several options are available:

- Currently, the road is used occasionally on a controlled-basis by the Rodeo Department with an understanding of airport procedures, whereby the end of the runway portion of the road is not crossed when an aircraft is taking off on Runway 5 or landing on Runway 23.

- The road could be relocated about 80 feet farther from the runway end at the east corner of the ROFA to meet the RSA and ROFA standards. This option would allow the road and Runway 5 to be used at the same time, and would require some property acquisition.

- The road could remain in its present position and the Runway 23 end shortened by approximately 80 feet. This would allow the road and Runway 5 to be used at the same time, but would not require property acquisition for road relocation.

Runway Protection Zones

The Runway Protection Zone (RPZ) is an area at ground level that provides for the unobstructed passage of landing aircraft through the above airspace and is used to enhance the protection of people and property on the ground. The RPZ should be kept free of all obstructions. No structure should be permitted nor the congregation of people allowed within the Runway Protection Zone. Control of the RPZs by the airport owner is strongly encouraged by the FAA to prohibit unsafe uses within the RPZs.

The RPZ dimensions meeting ARC B-I criteria for an instrument runway with visibility minimums not lower than one mile and a visual runway are shown in Table 5-3. When a runway threshold is displaced from the end of the runway, such as Runway 23, a landing and a departure RPZ are needed. Presently, the College does not have controlling interest in all the property within the RPZs (refer to the Airport Layout Plan in Section 7). Controlling interest should be obtained, preferably by fee title acquisition, or through an avigation easement.

Threshold Surfaces

The Threshold Surfaces are used to establish the location of runway thresholds to meet approach obstacle clearance requirements. The Threshold Surfaces are imaginary inclined planes extending from the ends of the runways. The dimensions of these surfaces for ARC B-I and ARC B-II are given in Table 5-3. For runways serving small planes only (up to 12,500 pounds maximum gross weight), the slope is 20:1 for visual runways and instrument runways with an approach visibility minimum of one mile. Objects must not penetrate these imaginary surfaces to allow the unrestricted flight of aircraft approaching the runways.

The existing 20:1 Threshold Surface to Runway 23 meets the FAA standards, having no penetrations. The clearance standard over a private road is ten feet or the height of the tallest vehicle normally travelling the road. The Runway 23 Threshold Surface is approximately 20 feet above the rodeo access road at the nearest point. If a non-precision instrument approach procedure, with an approach visibility minimum of one mile, were installed on Runway 23, the Threshold Surface slope would remain at 20:1, and FAA standards for the Runway 23 Threshold Surface would continue to be met.

The existing 20:1 Threshold Surface to Runway 5 meets the FAA standards. The required clearance over a public road is 15 feet. At its nearest point to the road, the Threshold Surface is approximately 15 feet above the roadway elevation. A future instrument approach procedure for Runway 23 would not change the Threshold Surface for Runway 5.

TAXIWAY REQUIREMENTS

Runway 5/23 is served by a full-length parallel taxiway with an exit taxiway at mid-field. The parallel taxiway is 20 feet wide. The mid-field exit taxiway is 30 feet wide. A taxiway width of 25 feet is the standard to accommodate all Airport Reference Code B-I aircraft (Table 5-3). Taxiway width standards can be applied for the aircraft with the greatest undercarriage width (measured as 1.15 times the main gear track) expected to use the airport regularly. For the Beech Baron, the undercarriage width is 8.0 feet. The taxiway width standard for this aircraft is 18.1 feet. Since this is the greatest undercarriage width of aircraft that normally use the airport, the airport currently meets the FAA aircraft-specific standard. However, it is recommended that the taxiway be widened to meet the general B-I standard to accommodate larger B-I airplanes that occasionally use the airport now and could be used in the future for flight training.

To accommodate ARC B-II aircraft, the taxiways would need to be widened to 35 feet (Table 5-3). Note that this standard applies to the entire ARC B-II group of aircraft.

The runway-to-taxiway centerline separation is 200 feet. This meets the standard of 150 feet for the present ARC B-I aircraft. It does not meet the aircraft-specific standard for the Beech 1900C (ARC B-II), which is 227.3 feet (the standard for accommodating all aircraft in the ARC B-II category is 240 feet).

The separation between centerline of the parallel taxiway and the aircraft shelter building is approximately 45 feet, which meets the separation requirements for ARC B-I (44.5 feet). To accommodate the Beech 1900C, an aircraft-specific separation of 48.2 feet would be needed (the standard to accommodate all ARC B-II aircraft is 65.5 feet).

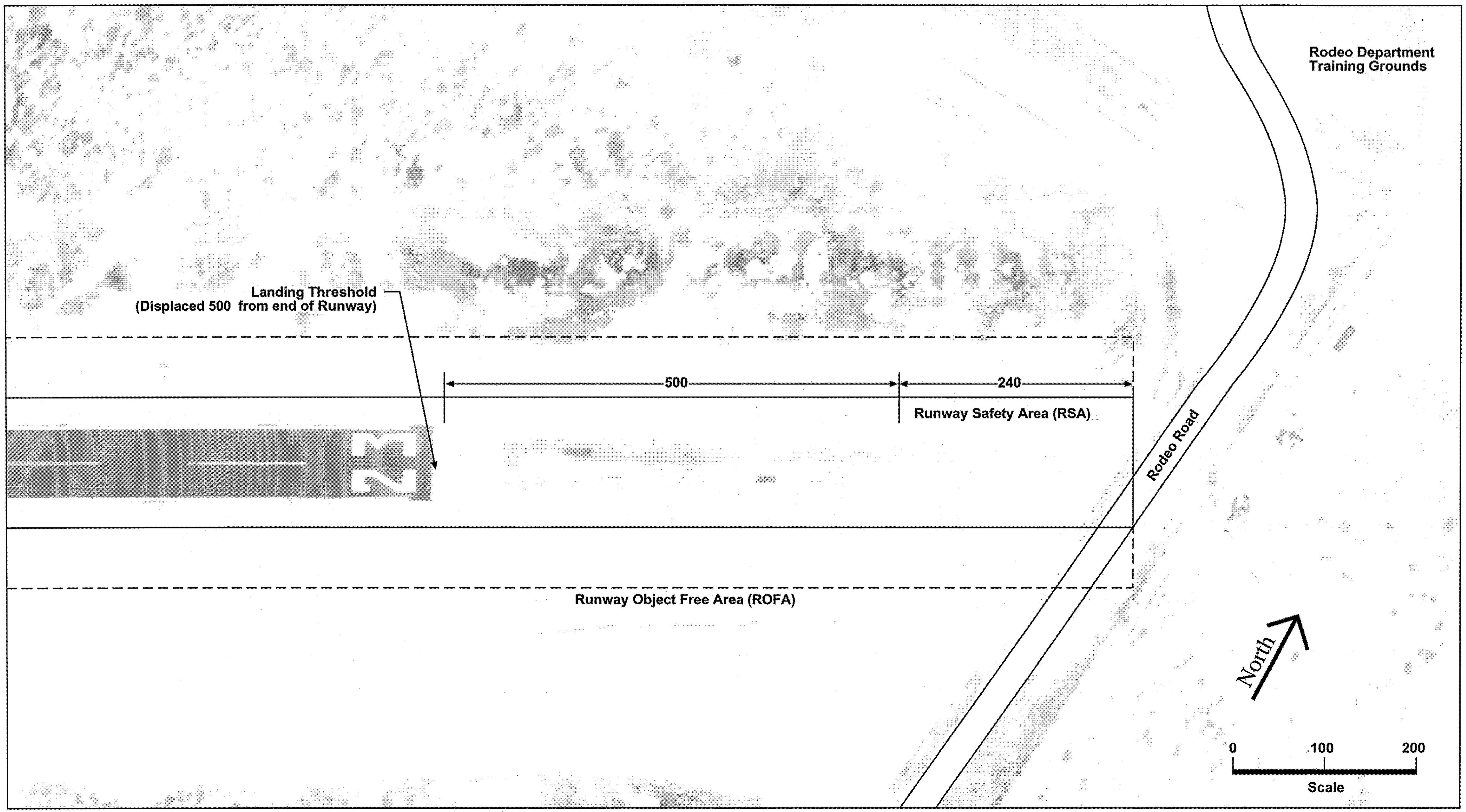

Figure 5-1
Runway 23 Runway Safety Area and Runway Object Free Area

AIRSPACE, NAVIGATIONAL AIDS, LIGHTING AND RELATED FACILITIES

Air Traffic Control Tower

The airport does not meet the minimum requirements for an FAA air traffic control tower. Unicom services are provided for local traffic pattern advisories.

Instrument Approach Capability

The Cochise College Aviation Program staff estimates there would be from 350 to 500 annual instrument approaches at the airport if a non-precision instrument approach system were available today. The Navigational Aids and Aviation Services Special Study, November 1998, prepared by the Arizona Department of Transportation, Aeronautics Division, projects a 2015 demand of three IFR aircraft operations in the peak hour. A cost-benefit analysis prepared in that study found that a Global Positioning System (GPS) instrument approach system at Cochise College Airport is justified economically. The study recommended installation in five to seven years of a GPS approach with a decision height or 250 feet and visibility of one mile.

GPS is the basis of the FAA's transition plan to satellite-based navigation. GPS offers many benefits including the ability to conduct precision approaches without the need for expensive ground-based equipment. Although the aircraft owner must equip the aircraft with GPS equipment, over time GPS-equipped aircraft are expected to become common.

Runway End Identifier Lights (REILs)

The FAA document Airway Planning Standard Number One-Terminal Air Navigation Facilities and Air Traffic Control Services (FAA Order 7031.2C) contains criteria for identifying candidate airports for navaids and visual aids. A runway is a candidate for runway end identifier lights (REILs) if there are at least 7,300 annual general aviation and military landings per year, is not currently equipped or programmed for an approach light system, and is lighted and approved for night operations. REILs provide rapid and positive identification of the approach end of a runway and consist of two synchronized flashing lights located on each side of the runway threshold. Based on estimating guidelines suggested in the document (FAA Order 7031.2C) and the estimated runway use (60 to 70 percent of operations on Runway 5), both Runways 5 and 23 qualify for REILs today. Based on the FAA qualifying criteria, the installation of REILs are recommended on both runways in the short term planning period (first five years).

Airfield Lighting and Marking

Medium intensity runway lights (MIRLs) are required for runways with instrument approach procedures with visibility minimums of ¾ statute mile or less. While a GPS instrument approach procedure at the airport may not achieve these minimums, it is recommended that the runway and taxiway edge lights be upgraded from low intensity to medium intensity to provide better airport visibility for instrument approaches during low visibility and nighttime conditions.

The runway has visual markings. With a GPS non-precision instrument approach system, non-precision runway markings would be required (FAA Advisory Circular 150/5340-1H, Standards for Airport Markings, August 31, 1997).

Automated Weather Observing System (AWOS) and Other Flight Support Systems

The Navigational Aids and Aviation Services Special Study, November 1998, prepared by the Arizona Department of Transportation, Aeronautics Division, concludes that an Automated Weather Observing System (AWOS-3) is economically justified at Cochise College airport, and recommends it be installed in five to seven years. The AWOS-3 provides real-time weather data at an airport, including ceiling height and visibility, to support instrument approach procedures. The installed cost of an AWOS-3 is about $75,000. A less expensive option (about $50,000) would be an AWOS-2, which provides visibility information but not ceiling height. The report also recommends the installation of pilot-controlled lighting to allow pilots to activate runway lights from the aircraft when the airport is unattended, and a ground communications outlet, a device that facilitates radio communication between a remote air traffic control facility and the aircraft.

TECHNOLOGY CENTER BUILDING

As the aviation program expands, additional space will be needed for classrooms for flight training and avionics, simulator facilities and dispatch area. In the future, if other programs occupying the Technology Center have a reduced need for space in the building, some aviation program activities could be expanded into that area, particularly classroom and simulator activity. If other program space needs in the building are not reduced, other means of expanding the aviation program space will have to be found.

AIRCRAFT STORAGE SHELTERS

Aircraft storage facilities must be provided to accommodate the aircraft forecast to be located at the airport over the next 20 years. Aircraft should be protected from sun and occasional hail. The aircraft shelter (shade) facilities presently in use at the airport adequately serve this purpose. Hangar storage of individual aircraft is not considered necessary.

Some of the aircraft based at Cochise College Airport are normally at Tucson International or are undergoing maintenance. Shade facilities are not needed for these based aircraft. The number of aircraft normally located at the airport is estimated to increase from ten today to 20 in 2020. Therefore, 10 additional aircraft shelters are needed over the planning period (Table 5-6).

AIRCRAFT MAINTENANCE HANGAR

Due to the projected growth in the College's A&P program and the expansion of the flight training fleet, there will be a need for additional aircraft maintenance hangar space. A potential solution would be to dedicate the hangar in the Technology Center to the A&P program and build a new hangar for maintenance of the training aircraft fleet. Although requirements for a new hangar can not be established at this time, it is assumed for master planning purposes that the new hangar will be approximately 60 feet by 90 feet.

AIRCRAFT PARKING APRON

Tiedown spaces on an aircraft parking apron are required to accommodate the following:

- Non-flyable aircraft in the College's aviation maintenance curriculum. There are presently six of these aircraft at the airport.
- Aircraft that are permanently based at Cochise College Airport but normally located elsewhere. Typically, about five aircraft are either in the Tucson program or in maintenance at any time.
- Other uses, which include aircraft that fly in for special seminar programs or an occassional miscellaneous transient aircraft.

Collectively, the tiedown space needs for such aircraft is expected to grow from 24 today to 32 in 2020 (Table 5-6). The apron area needed to accommodate the spaces will depend on the apron configuration.

Table 5-6
AIRCRAFT STORAGE AND PARKING REQUIREMENTS
COCHISE COLLEGE AIRPORT

Item	Actual 1999	Required 2005	2010	2020
Aircraft Shelters				
Total Based Aircraft	15	20	22	27
Aircraft Normally at Tucson or in Maintenance	5	5	6	7
Aircraft in Shelters at Cochise College Airport	**10**	**15**	**18**	**20**
Tiedown Spaces				
A&P Program Aircraft (not flyable)	6	8	10	12
Aircraft Normally at Tucson or in Maintenance	5	5	6	7
Other Uses [a]	13	13	13	13
Total Tiedown Spaces	**24**	**26**	**29**	**32**

[a] Includes special needs such as fly-ins for FAA seminars and miscellaneous transient aircraft.
Source: Analysis by P&D Aviation.

AIRCRAFT RESCUE AND FIRE FIGHTING (ARFF) FACILITIES

FAA Advisory Circular 150/5210-6C establishes recommended scales of fire fighting protection for general aviation airports. Presented in the Advisory Circular are two indices used in determining the level of protection based on the types of aircraft and the number of operations. The two indexes are as follows:

- Index 1 -- Airports having at least 1,825 annual departures of aircraft more than 30 feet but no more than 45 feet long.

- Index 2 -- Airports having at least 1,825 annual departures of aircraft more than 45 feet but not more than 60 feet long.

The Beech Baron, 29.8 feet in length, is currently the largest aircraft in regular service at the airport. Based upon the above criteria, compliance with either Index 1 or 2 is not presently required. Fire protection is provided by the Douglas Fire Department, through an inter-governmental agreement with the College. The response time to a call at the Airport is estimated to be 25 to 30 minutes.

If ARC B-II aircraft, such as the Beech 1900C turboprop (57.9 feet long), is used for flight training, the airport would need to meet Index 2 standards. The minimum requirement to meet this standard is:

- One fire truck with primary agent capability of (a) a capacity for 310 gallons of water for Aqueous Film Forming Foam (AFFF) production and a solution application rate of 230 gallons per minute, or (b) a capacity of 490 gallons of water for protein foam and a solution application rate of 350 gallons per minute.

- Supplementary agent capability 400 pounds of dry chemical powders.

AIRPORT MAINTENANCE

The present airport maintenance facilities are considered adequate to accommodate future needs.

AVIATION FUEL STORAGE

Aviation Gas (Avgas)

Bulk avgas storage requirements were determined for the airport and based upon the forecast of aviation gas (avgas) flowage contained in Section 4. Avgas flow was projected in gallons pumped per peak month and was based on the peak month relationship estimated for aircraft operations (10 percent of annual). The bulk avgas storage requirement is determined on the basis of the projected consumption, using a 30-day storage capacity as an ideal inventory (Table 5-7). Based on this approach, it was found that the existing 10,000-gallon tank will provide adequate storage capacity to 2020.

Jet-A Fuel

Currently, no Jet-A fuel is dispensed at the airport. If turbojet aircraft would be operated at the airport, the estimated the Jet-A fuel consumption would be less than 5,000 gallons a month. One 5,000-gallon tank would be needed to provide at least a 30-day Jet-A fuel storage capacity.

Table 5-7
AVIATION GAS STORAGE REQUIREMENTS
COCHISE COLLEGE AIRPORT
(Gallons)

Item	Actual 1999	Required 2005	2010	2020
Annual Avgas Flowage	32,000	43,000	47,000	57,000
Peak Month Flowage	3,200	4,300	4,700	5,700
Average Day Flowage in Peak Month	110	140	160	190
Storage Requirement [a]	10,000	4,200	4,800	5,700

[a] Storage requirement based on a 30-day reserve.
Source: P&D Aviation analysis.

UTILITIES

Water, sewer, power, telephone, and natural gas utilities will be required for the proposed aircraft maintenance building and electrical power will be required for the other proposed facilities. There appears to be adequate existing utilities on campus, these will be extended to the proposed facilities.

GROUND ACCESS, SIGNAGE, AND VEHICLE PARKING

The College is situated off of State Route 80, which connects Bisbee to Douglas and other points to the east is an all-weather highway maintained by the State of Arizona. The roadway is a two lane 24-foot roadway with two-way traffic. The normal capacity for this type of road is 1,400 vehicles/lane/hour (Highway Capacity Manual Special Report 209, Transportation Research Board). It is expected that this access roadway system will be adequate to accommodate airport-generated traffic together with all other traffic.

The college should submit an application to the area ADOT Highway district (Safford district, 2082 E. HWY 70, Safford, AZ 85546 – phone 520-428-5470) for the installation of general information signs on the eastern and western approaches to the College Campus. The sign should be of type I-5Z, the international symbol for airports (propeller plane).

The College should update its on-campus signage with the addition of a sign for the airport.

Vehicle parking space at the Technology Center will also have to be expanded in the future unless there are reductions in the activity of other program uses of the building. On a typical day, the aviation program students and faculty account for an estimated 35 spaces of the 80 paved spaces at the Technology Center. There is an unpaved area south of the paved parking area that is available for overflow parking. Assuming the need for aviation program parking spaces increases in proportion to the number of flight operations, there may be a requirement for about 63 paved spaces in 2020.